REV.1
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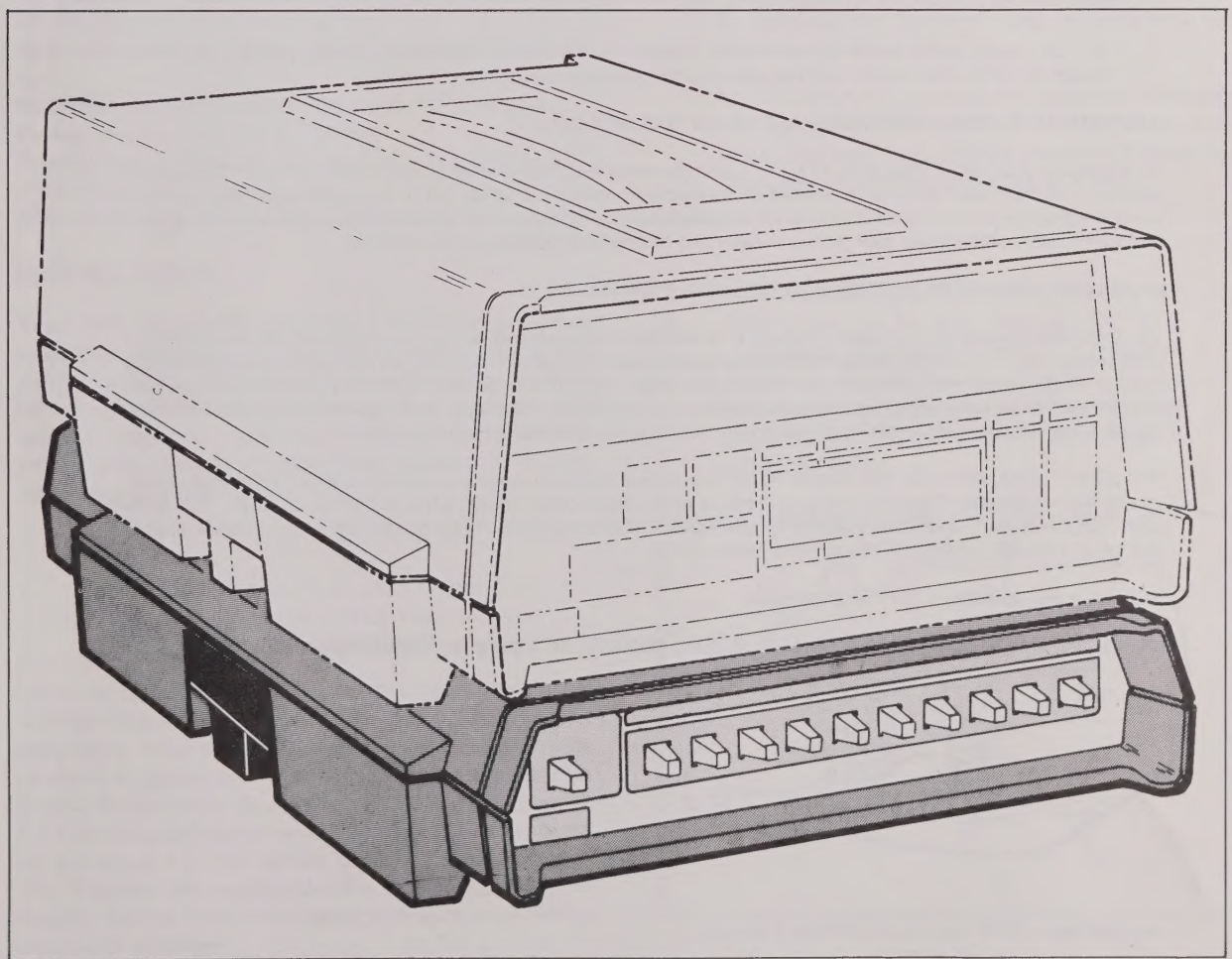
FLUKE®

Instruction Manual

Model Y2001

Thermocouple Multipoint Selector



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John Fluke Mfg. Co., Inc., P.O. Box 43210, Mountlake Terrace, Washington 98043

Rev. 4/80

INTRODUCTION

The Model Y2001 Thermocouple Multipoint Selector is a manually switched scanner that allows selection of one of ten thermocouple inputs to be displayed by the 2190A Digital Thermometer. The Y2001 inputs are divided into two groups of five each so that two different types of thermocouple probes may be monitored. Two or more Model Y2001's can be stacked in a serial configuration when requirements for more than ten thermocouple probes exist.

SPECIFICATIONS

Specifications for the Y2001 Thermocouple Multipoint Selector are as follows:

The Y2001 does not deteriorate the accuracy or other characteristics of the 2190A. Each channel read will be identified by number when a digital printer is used with the 2190A with Option 21X0-002.

Number of Channels: Ten, up to 100 with more than one Y2001.
Thermocouple Types Accommodated: Seven, five per 2190A. See 2190A accuracy table.
Thermocouple Types Selectable: Two, five channels per type.
Maximum Voltage Between Channels: 125V ac rms.
Power: 25 mW, supplied by 2190A.
TemPak Bus: Rear panel receptacle plus 46 cm cable with connector.
Size and Weight: Style A case, 1.6 kg (3 lbs. 7 oz), typical.

INSTALLATION

The Y2001 is installed by attaching it to the Accessory Bus and Thermocouple Input connections using the permanently attached cables for the accessory bus and the thermocouple. If the unit is being used in series with another multipoint selector or alarms accessory the permanently attached cables are connected to the previous unit in the series.

NOTE

If the Y202 Accessory is used it must be connected between the 2190A Thermometer and the Y2001 Multipoint Selector accessory.

If two or more multipoint selectors are used in a system with an Output Unit, Option 21X0-002, Channel MSD assignment must be made to differentiate between the channels of subsequent units in the output message. This is done by removing the applicable diodes (CR1 through CR4) to assign an address in a BCD code. CR4 is removed for a count of 1X, CR3 for 2X, CR2 for 4X, and CR1 for 8X. Remove the applicable diodes for the channel number desired. Use the following procedure to install the multipoint selector:

1. On the bottom of the instrument remove the screws that attach the top cover to the case botton and then lift the top cover away for access to the interior of the instrument.

2. If required, remove the applicable channel selection diodes.

3. Attach the input thermocouples to the input connectors and insure the wires exit through the access port.

NOTE

Only two types of thermocouples may be connected to any multipoint selector and all points within a group, i.e., 0 through 4 and 5 through 9, must be of the same type.

4. Referring to Figure 1, A1 Thermocouple Multipoint Selector PCB Assembly and Table 1. Thermocouple Input Switch setting, set switches S1 and S2 to the appropriate positions corresponding to the thermocouple type installed on the applicable channel or channels.

5. Replace the top cover and reattach it to the bottom with the screws,

6. Connect the permanently attached accessory bus cable and thermocouple wires (red to plus, black to minus) to the 2190A inputs or, if installed, the Y2002 or previously installed Y2001.

NOTE

The Thermocouple Selector switch on the 2190A can be in any position EXCEPT Calibration (positions 8 and 9). Positions 8 and 9 on the 2190A's input module are for calibration use only. The selection of these positions will override the normal operation of the Y2001.

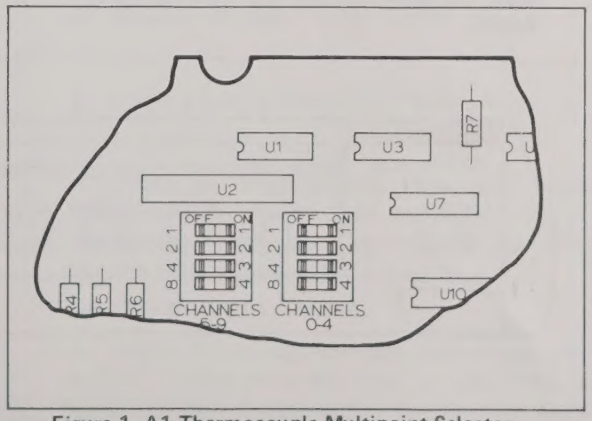


Figure 1. A1 Thermocouple Multipoint Selector PCB Assembly

Table 1. Thermcouple Input Switch Settings

SELECTION CODE	SWITCH POSITIONS				T/C TYPE or OPERATION
	1	2	4	8	
0	OFF	OFF	OFF	OFF	J
1	ON	OFF	OFF	OFF	K
2	OFF	ON	OFF	OFF	T
3	ON	ON	OFF	OFF	E
4	OFF	OFF	ON	OFF	C
5	ON	OFF	ON	OFF	S
6	OFF	ON	ON	OFF	R
7	ON	ON	ON	OFF	Display Blanked
8	OFF	OFF	OFF	ON	Calibration
9	ON	OFF	OFF	ON	Calibration

OPERATING FEATURES

The controls on the Y2001 front panel, as shown in Figure 2, consist of ten individual channel selectors (0 through 9) and an EXTENSION switch. EXTENSION is selected when a channel in another Y2001 in the chain is selected. The CHANNEL switches select the thermocouple probe to input temperature data to the thermometer and no more than one can be selected at any time.

OPERATING NOTES

The following subparagraphs describe conditions that should be considered before operating the Y2001 Multipoint Selector.

Input/Output Connections

WARNING

THE INTERIOR OF Y2001 SHOULD BE ACCESSED ONLY BY QUALIFIED PERSONNEL. LETHAL VOLTAGE MAY EXIST ON EXPOSED INPUT/OUTPUT TERMINALS DUE TO COMMON-MODE PROBE VOLTAGES.

Thermocouple inputs to the unit are on screw type terminals, two per input. They are accessible when the top cover is removed. Each pair (positive and negative) are marked with polarity and channel number (LSD if two or more units are used). The pairs are divided into two groups of five, each with a thermocouple type select switch. All inputs within a group must be of the same thermocouple type.

Two additional terminals are provided adjacent to the rear panel for the inputs from succeeding units. The accessory bus input from succeeding units is a 25-pin connector located at the center of the rear panel.

Outputs from the unit are on wires and a cable that are permanently attached to the unit pcb. Two wires are available for thermocouple inputs to the thermometer or any previous instrument in a series. The accessory bus is on a 25-wire flat cable with a standard 25-pin connector attached for connection to the thermometer or a previous instrument in the series.

GUARD CIRCUIT

Each of the input/output circuits in the instrument are guarded to prevent errors from interchannel leakage currents. The currents result from common-mode voltages at the input terminals, and are absorbed by the guard. To comply with IEC land spacing specifications the voltage differential between pairs of channels should not exceed 184V dc and 125V ac (rms).

OPERATION

Operate the multipoint selector accessory using the following procedure:

1. Verify the Y2001 has been properly connected into the system using the procedure previously described.
2. Energize the 2190A Digital Thermometer.
3. Install the thermocouple probes into their operating environment.

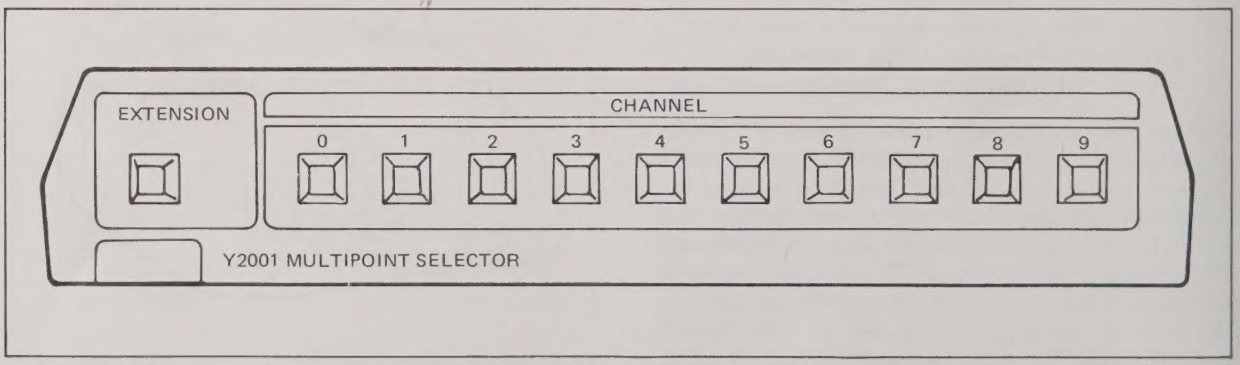


Figure 2. Front Panel

NOTE

If more than one Y2001 is installed in series, verify the EXTENSION switch is depressed in all units except the unit to which the desired test thermocouple is attached. If more than one EXTENSION switch is extended (switch out) the selected channel on the first Y2001 in the series is the channel read and displayed.

4. Select the channel corresponding to the desired thermocouple.

5. Monitor the thermocouple output on the 2190A Digital Thermometer.

THEORY OF OPERATION

Circuitry for the multipoint selector consists of an analog and a digital section. Each of these sections is covered in separate subparagraphs below.

Analog Section

The analog section consists of the ten manual CHANNEL selection switches, the EXTENSION switch and the reference junction compensation (isothermal block) circuit. Closing one of the six pole, double throw CHANNEL switches automatically cancels any switch previously closed and connects the applicable channel terminals to the J8 Output Terminals. At the same time, a ground is applied from the closed CHANNEL switch to the digital section. The EXTENSION switch completes the circuit for the isothermal block transistor when open (out) and connects the input terminals to the output terminals when closed (in).

The thermometer uses the multipoint selector's isothermal block circuit when it is selected instead of its own. This allows the Y2001 to be connected to the thermometer with copper wire and eliminates the possibility of temperature gradient errors between the selected terminal block and the reference compensation circuit.

The guard circuit eliminates the possibility of interchannel leakage to insure the integrity of the individual thermocouple voltage levels that pass through the unit. This leakage could otherwise result from the presence of common-mode voltages between the channels.

Digital Section

Before the thermometer can communicate with the multipoint selector it must address it on the accessory bus. When the $\overline{\text{WRTADR}}$ line is low it enables U8-4 so that the repetitive $\overline{\text{DCLK}}$ pulses can clock the address on the $\overline{\text{DATA}}$ line into the shift register U7. If the decoder four bit address at U10-13 is low is enables U11-2 on the output gate in preparation of outputting data to the bus from the multipoint selector.

After the accessory has been addressed both $\overline{\text{WRTADR}}$ and $\overline{\text{WRT}}$ go high for a low at U10-1 to enable U8-1 and U11-1. U8-3 now toggles with $\overline{\text{DCLK}}$ and moves the data in the shift registers U3 and U4 onto the $\overline{\text{DATA}}$ line for transfer to the thermometer. U4 is loaded with the BCD channel number at pin 4 (MSD), 5, 6, and 7, and the BCD channel number at pins 1 (MSD), 15, 14, and 13. The channel number is decoded at the inputs to U11-10 to make that point go low for channels five through nine and remain high for channels zero through four. This is decoded by the settings of S1 and S2 to load the thermocouple type, as selected by the switches, into U3, pins 5, 6, and 7.

CALIBRATION

The Y2001 Multipoint Selector should be calibrated concurrently with the 2190A Digital Thermometer, i.e., either quarterly or annually or when repairs have taken place. The procedure following assumes that the 2190A used has just completed calibration and is properly connected to the multipoint selector. The equipment required is listed in Table 2.

1. Remove the cover from the Y2001 Multipoint Selector.

2. Attach either a "J" or "K" type thermocouple to any channel on the multipoint selector and select the applicable switch setting.

3. Replace the cover on the Y2001.

4. Apply power to the 2190A Thermometer.

5. Install the thermocouple probe in a room temperature lag bath (refer to 2190A Digital Thermometer instruction manual for lag bath construction, if required).

6. Adjust R1 through the rear panel access port until the temperature displayed on the 2190A is equal to the temperature on the lag bath thermometer.

Table 2. Calibration Equipment

DEVICE	SPECIFICATIONS	MODEL
J or K Type Thermocouple	Meets ANS Standard MC96.1	Fluke P20J or Fluke P20K
Dewar Flask/Cap	1 pint capacity	Thermos
Mercury Thermometer	0.05°F Resolution or 0.02°C Resolution	Princo Model ASTM56F Princo Model ASTM56C
Decade Resistor	Accuracy: 1% Ranges: 1k, 10k and 100k	General Radio 1434

SELECTED COMPONENT REPLACEMENT

If the reference-junction transistor (Q3) is replaced the reference-junction bias resistor R2 must also be replaced as it is a selected resistor that must be individually matched to Q3. After the correct value has been selected for R2 the calibration procedure must be performed to readjust R1. Select R2 using the following procedure:

1. Connect the Y2001 to a 2190A Thermometer, connect a thermocouple probe to one of the multipoint channel input terminals (K-type thermocouple preferred), select the applicable thermocouple on the select switch, select the applicable channel on the front panel and insert the thermocouple probe into a lag bath.

2. Center the reference-junction potentiometer R1.

3. Connect a decade box in place of the reference-junction bias resistor, R2.

4. Adjust the decade resistance box for the value, from Table 3, that causes the temperature display on the 2190A to read closest to the lag bath temperature.

5. Remove power, disconnect the decade box and connect the resistor selected from the table.

6. Recalibrate the Y2001 Multipoint Selector.

Table 3. Bias Resistor Values

VALUE	JOHN FLUKE PART NUMBER	VALUE	JOHN FLUKE PART NUMBER
49.9k	268821	110k	234708
52.3k	237248	124k	288407
54.9k	271353	140k	289439
57.6k	289116	162k	375998
60.4k	291419	191k	374923
63.4k	235382	237k	288373
68.1k	236828	309k	235283
73.2k	237222	332k	289504
78.7k	289058	464k	271908
84.5k	229492	562k	235358
90.9k	223537	1.05M	260737
100k	248807	∞	Open

TROUBLESHOOTING

Troubleshooting for the Y2001 consists of the tabular flow chart in Table 4. When a step on the flow chart is completed, check for a decision transfer. If no decision is required, perform the next step of the table is sequence.

LIST OF REPLACEABLE PARTS

A list of replaceable parts for the Y2001 starts in Table 5.

BACKDATING

This manual documents the Model Y2001 for Revision level F for the Thermocouple Multipoint Selector Assembly and Revision level B for the Switch Assembly. Refer to the supplemental Change/Errata sheet for newer assemblies or to the backdating data in Appendix A for older assemblies.

Table 4. Troubleshooting

STEP NO.	ACTION	Go to the step number given for correct response	
		YES	NO
	NOTE *These tests are based on the assumption that the 2190A has been thoroughly checked out and is free of troubles prior to being connected to the Y2001.*		
1	Connect the Y2001 to the 2190A with the accessory bus cable, select channel 0 on the multipoint, short the thermocouple input on the 2190A and apply power to the 2190A.		
2	Does the 2190A display read approximately the ambient temperature?	4	3
3	Check the voltages on the multipoint +5 in reference to digital common, +15V in reference to analog common, -15V between RJ COM and digital com. Check the same figures on the 2190A with the Y2001 disconnected to check for loading if all voltages are good on the Y2001. Check R1, R2, R3, and Q3 on Y2001. Repair as required then resume at Step 1.		
4	Remove power from the 2190A, connect the thermocouple connector between the two units, and apply power to the 2190A.		
5	In turn, select each channel on the Y2001 and short the selected input terminals.		
6	Does the 2190A display read approximately the ambient temperature for each channel?	8	7
7	Check the switch contacts and connections. Repair as required then resume at Step 5.		
8	Do the $\overline{\text{DATA}}$, $\overline{\text{DCLK}}$, $\overline{\text{WRTADR}}$ and $\overline{\text{WRT}}$ toggle (vary between logic high and logic low) when viewed with a scope grounded at digital com?	10	9
9	Check the defective lines for bad cable and/or connectors, and for loading. Repair as required then resume at Step 10.		
10	Is +5V present between pins 14 and 7 (low) of U8, U9 and U10 and U11; between pins 16 and 8 (low) of U3, U4 and U7; and from digital common to U2-1?	12	11
11	Check the land pattern to the affected IC. Repair as required then resume at Step 10.		
12	Is the signal at U9-6 and U11-9 toggling (opposite polarity)?	24	13
13	Is the signal at U11-1 toggling?	15	14
14	Check U10-1 and its inputs. Repair as required then resume at Step 12.		
15	Is the signal at U11-2 toggling?	17	16
16	Check U10-13 and its inputs from U7, check for toggling data at U7-7 and clock at U7-9 and their inputs. Repair as required then resume at Step 12.		
17	Is the signal at U11-9 toggling?	23	18
18	Is the signal at U8-3 toggling?	20	19
19	Check U8-3 and its inputs. Repair as required then resume at step 12.		
20	Is the signal at U9-2 toggling?	22	21
21	Check U9-2 and its input. Repair as required then resume at Step 12.		
22	Check U9-4 and U3, U4 and their inputs. Repair as required then resume at Step 12.		
23	Check U11-9, U9-6, Q1, Q2 and their associated components. Repair as required then resume at Step 12.		
24	Attach any allowable type thermocouple to the channel 0 input connectors and select channel 0.		

Table 4. Troubleshooting (cont)

STEP NO.	ACTION	Go to the step number given for correct response	
		YES	NO
25	Rotate the Y2001 Thermocouple type select switch for bank 1 (channels 0-4) through its range. The 2190A display should read the ambient temperature for the thermocouple type connected, be blank for types not included in the program, and a differenct figure for each of the other four types selectable. *NOTE* *The above step is testing switch operation only. The display for thermocouple types other than the one installed will be only approximations.*		
26	Connect the thermocouple to a channel in bank 2 (channels 5-9), select that channel and rotate the thermocouple type select switch through the thermocouple types, observing the display.		
27	Is the display as stated through the range of both thermocouple type select switches?	32	28
28	Check that U11-10 changes states when channel selection changes from one bank to the other. Check that U11-6 is of the opposite polarity and changes states at the same time.		
29	Are the signals correct at U11-10 and U11-6?	31	30
30	Check U11, U8, U9, U6 and its inputs from the channel selection switches, and their associated components. Repair as required then resume at Step 24.		
31	Check U1 and the thermocouple type select switches S1 and S2. Repair as required and resume at Step 24.		
32	Is the 2190A equipped with an Output Option -002?	33	36
33	Obtain a printed output from the 2190A with channel selected in the Y2001.		
34	Is the channel number printed correctly?	36	35
35	If the channel LSD is incorrect check U4 and U6 including its inputs from the channel selector switches. If MSD is incorrect check U4 and the diode array (CR1, CR2, CR3, CR4). Repair as required then resume at Step 33.		
36	Troubleshooting of the Y2001 Multipoint selector is complete.		

Table 5. Final Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1	TC MULTIPOINT SELECTOR PCB ASSY	469411	89536	469411	1		
H1	SCREW,FHP,6-32X5/8(FASTEN TOP TO BOTTOM)	114876	89536	114876	4		
H2	SCREW, FHP, 82 DEGREES COUNTERSUNK	484790	89536	484790	2		
H3	SCREW	174391	89536	174391	1		
HB1	INSTRUCTION MANUAL	489245	89536	489245	1		
MP1	DECAL, RETAINER	473645	89536	473645	2		
MP2	HANDLE	454751	89536	454751	1		
MP3	RETAINER, HANDLE	467563	89536	467563	2		
MP4	GUARD, COVER A SIZE	464198	89536	464198	1		
MP5	COVER, A SIZE	454710	89536	454710	1		
MP6	INSULATOR, GUARD COVER	488387	89536	488387	1		
MP7	BASE, STANDARD	454702	89536	454702	1		
MP8	GUARD, BASE	464404	89536	464404	1		
MP9	REAR PANEL	464446	89536	464446	1		
MP12	LATCH	467548	89536	467548	2		
MP13	BAIL	467555	89536	467555	1		
MP14	FOOT, NONSKID	467571	89536	467571	4		
MP16	FRONT PANEL	475293	89536	475293	1		
MP17	FRONT PANEL DECAL	454694	89536	454694	1		
MP18	DECAL, BOTTOM	473934	89536	473934	1		
MP19	DECAL, BASE SIDES	473652	89536	473652	2		
MP20	GROMMET, BLACK, RUBBER	380782	77969	68	2		

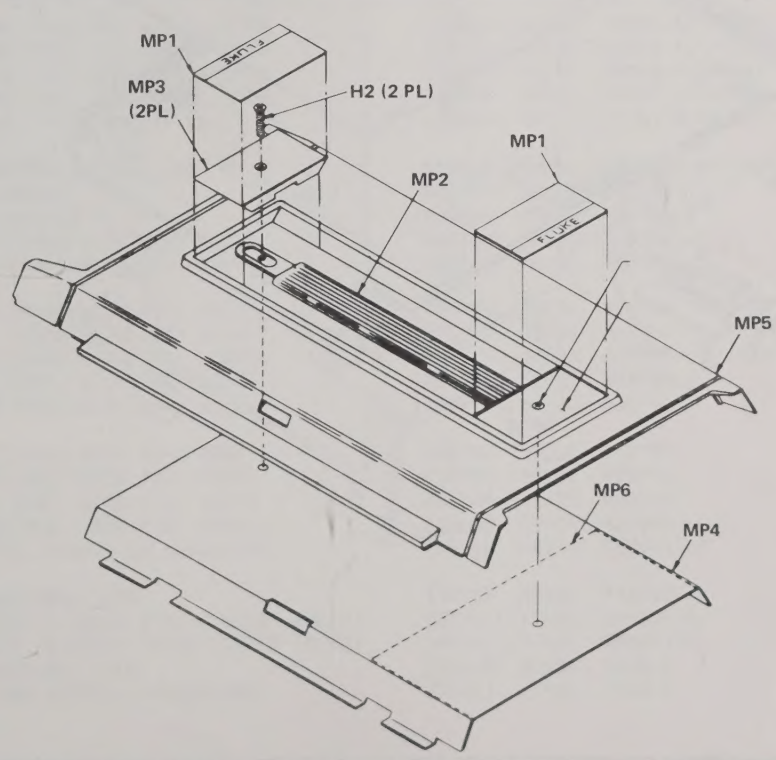


Figure 3. Final Assembly

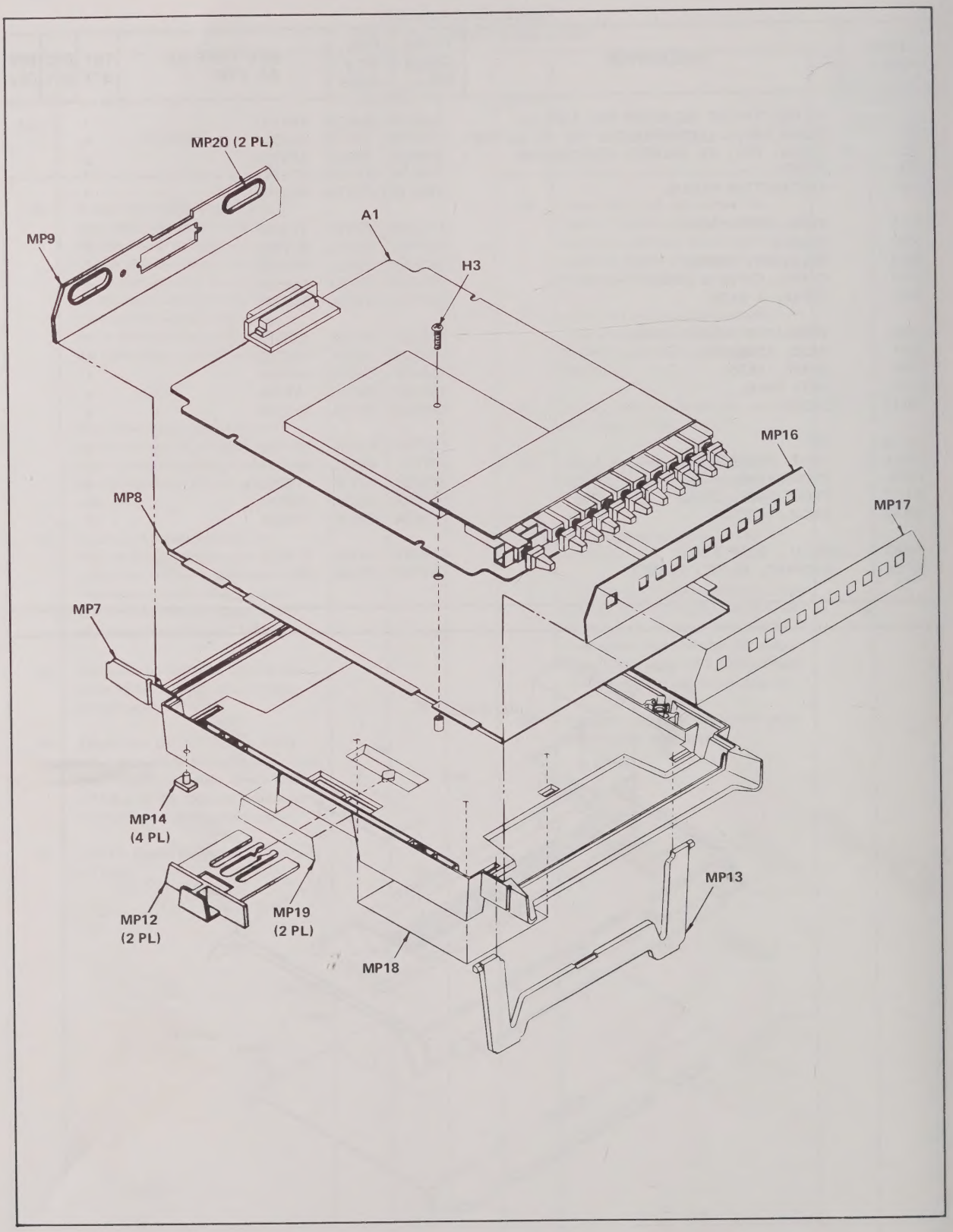


Figure 3. Final Assembly (cont)

Table 6. A1 TC Multipoint Selector PCB Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1	TC MULTIPOINT SEL PCB ASSY (2190A-4130)	469411	89536	469411	REF		
A1A1	SWITCH ASSY	476176	89536	476176	1		
CR1	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	4	1	
CR2	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR3	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
CR4	DIODE, SI, HI-SPEED SWITCHING	203323	07910	1N4448	REF		
H1	SPACER, PCB STANDOFF	28533	71590	J64284	5		
H2	PRESS-NUT	380196	24347	KF2-440	7		
H3	SCREW, PHP, 6-32 X 3/8	334458	89536	334458	22		
H4	LOCKWASHER	110395	89536	110395			
H5	SCREW, SEMS, 4-40 X 3/8	281196	89536	281196	7		
H6	SCREW, PHP, 4-40 X 3/8	152124	73734	19024	2		
H7	WASHER, FLAT	147728	73734	1402	2	H8	
J5	CONNECTOR	461996	00779	206584-1	1		
MP1	ISOTHERMALBLOCK	472308	89536	472308	1		
MP2	INSULATOR	472480	89536	472480	1		
MP3	CABLE TIE	172080	06383	SST-1M	1		
P5	CABLE ASSY	473479	89536	473439	1	P8	
P8	CABLE	481788	89536	481788	1		
Q1	XSTR, SI, NPN	218396	89536	218396	1	1	
Q2	XSTR, SI, PNP	195974	89536	195974	1	1	
Q3	XSTR, SI, NPN	329698	89536	329698	1	1	
R1	RES, VAR, 50K +/-10%, 1/2W	330688	75378	190PC503B	1		
R2	RES, SELECTED - SEE PROCEDURE						
R3	RES, MTL FILM, 187K +/-1%, 1/8W	291641	91637	CMF551873F	1		
R4	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	5		
R5	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R6	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R7	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
R8	RES, DEP CAR, 100K +/-5%, 1/4W	348920	80031	CR251-4-5P100KT	1		
R9	RES, DEP CAR, 10K +/-5%, 1/4W	348839	80031	CR251-4-5P10KT	REF		
S1	SWITCH MODULE	408559	00779	435166-2	2		
S2	SWITCH MODULE	408559	00779	435166-2	REF		
S3	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	10		
S4	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S5	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S6	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S7	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S8	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S9	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S10	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S11	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S12	BUTTON (GOES WITH A1A1 ASSY)	426759	89536	426759	REF		
S13	BUTTON (GOES WITH A1A1 ASSY)	425900	89536	425900	1		
U1	IC, CMOS, QUAD 2-IN NAND GATE	355198	04713	MC14011CP	1	1	
U2	RES, NETWORK, 100K	412908	89536	412908	1		
U3	IC, CMOS, 8-STAGE STATIC SHIFT REGSTR	380766	12040	MM5621AN	2	1	
U4	IC, CMOS, 8-STAGE STATIC SHIFT REGSTR	380766	12040	MM5621AN	REF		
U5	RES, NETWORK, 100K	380618	89536	380618	1	1	
U6	IC, DIODE MATRIX, PROGRAMMED	370676	89536	370676	1	1	

Table 6. A1 TC Multipoint Selector PCB Assembly (cont)

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
U7	IC, CMOS, DUAL 4-BIT STATIC SHIFTREG	340125	04713	MC14015BCP	1	1	
U8	IC, CMOS, QUAD 2-IN NOR GATE	355172	04713	MC14001CP	1	1	
U9	IC, CMOS, HEX INV	404681	04713	MC1406BCP	1	1	
U10	IC, CMOS, DUAL 4-IN, POS NAND GATE	355206	04713	MC14012CP	1	1	
U11	IC, CMOS, 3-IN NOR GATE	355180	04713	MC14025CP	1	1	

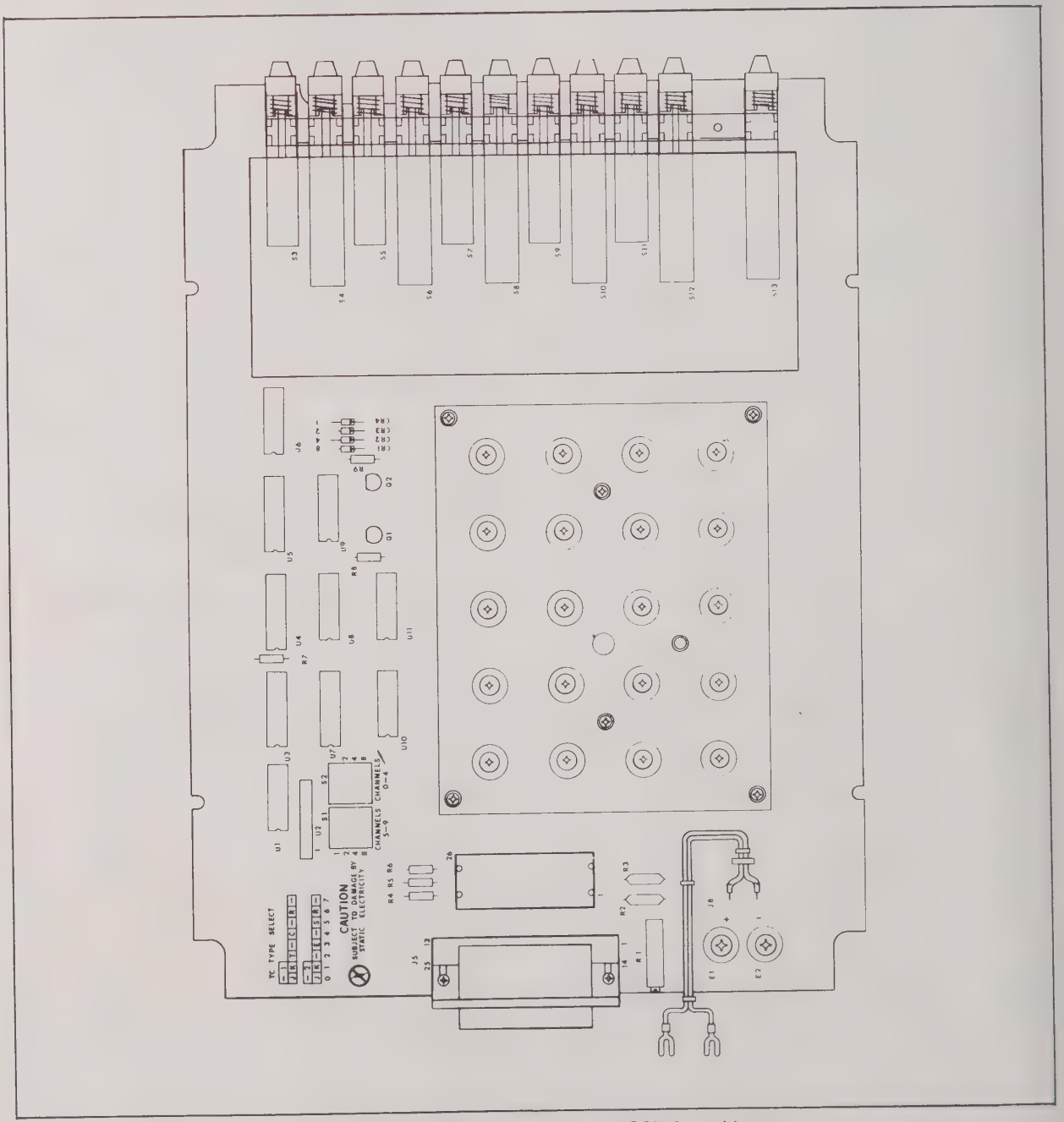


Figure 4. A1 TC Multipoint Selector PCB Assembly

Table 7. A1A1 Switch Assembly

ITEM NO.	DESCRIPTION	FLUKE STOCK NO.	MFG SPLY CODE	MFG PART NO. OR TYPE	TOT QTY	REC QTY	USE CDE
A1A1	SWITCH ASSY	476176	89536	476176	REF		
MP1	SPACER	285353	71590	J64284	4		
R1	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	20		
R2	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R3	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R4	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R5	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R6	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R7	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R8	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R9	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R10	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R11	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R12	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R13	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R14	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R15	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R16	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R17	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R18	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R19	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		
R20	RES, DEP CAR, 470 +/-5%, 1/4W	343434	80031	CR251-4-5P470ET	REF		

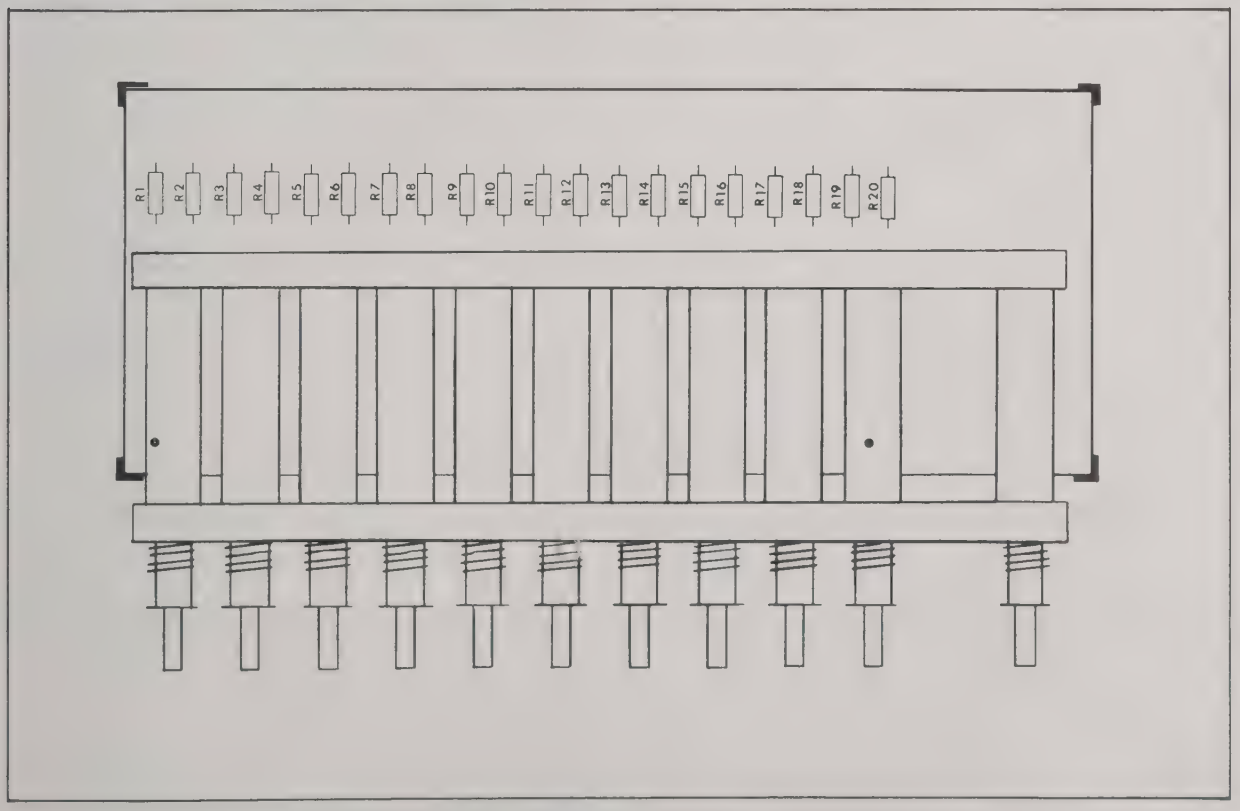
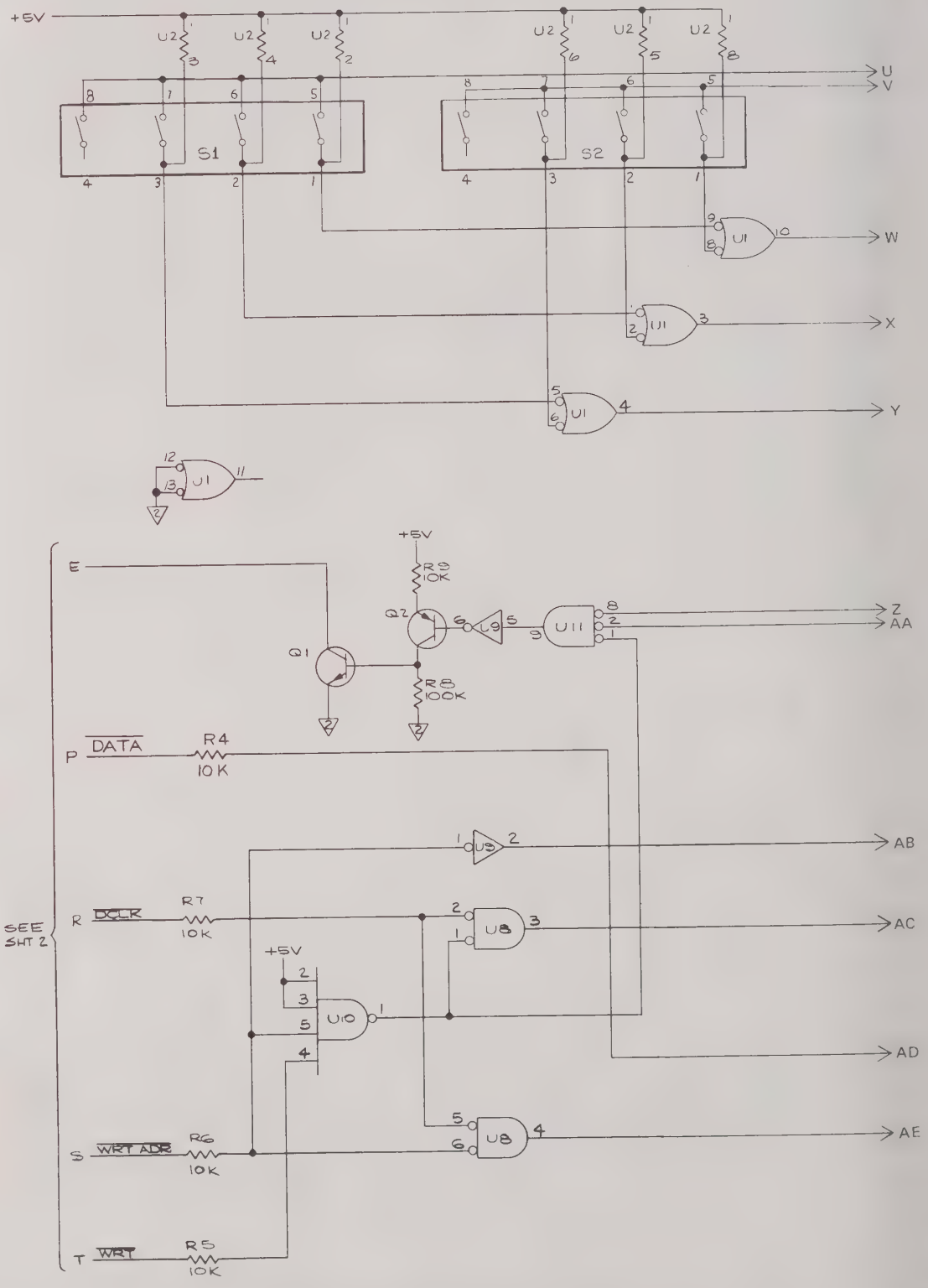


Figure 5. A1A1 Switch Assembly


+5V
U2
S1
S2
U
V
W
X
Y
U1
U11
E
Q1
Q2
R9
10K
R8
100K
Z
AA
P
DATA
R4
10 K
AB
R
DCLR
R7
10K
SEE SHT 2
U8
AC
U10
AD
S
WRT ADR
R6
AE
T
WRT
R5

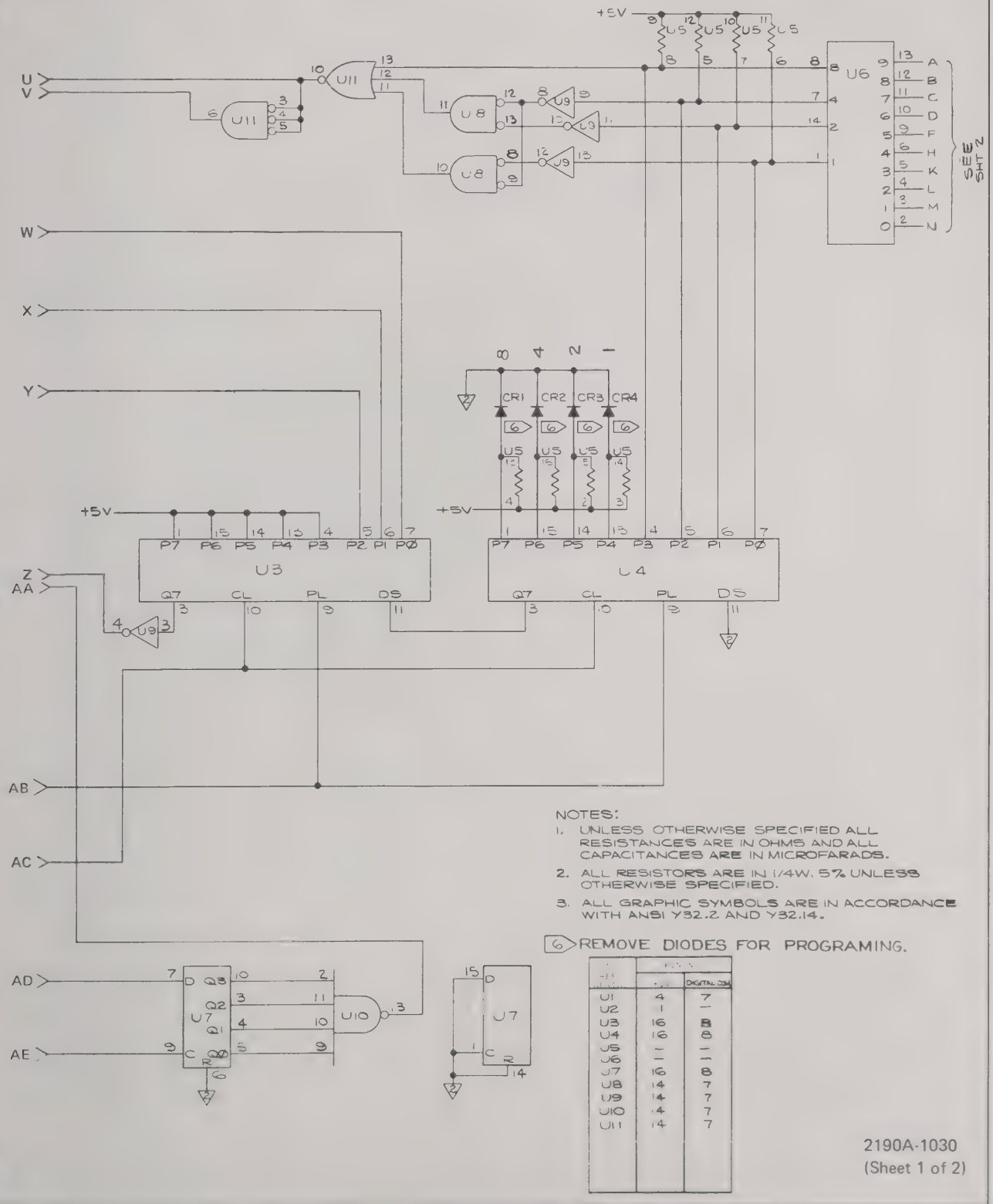
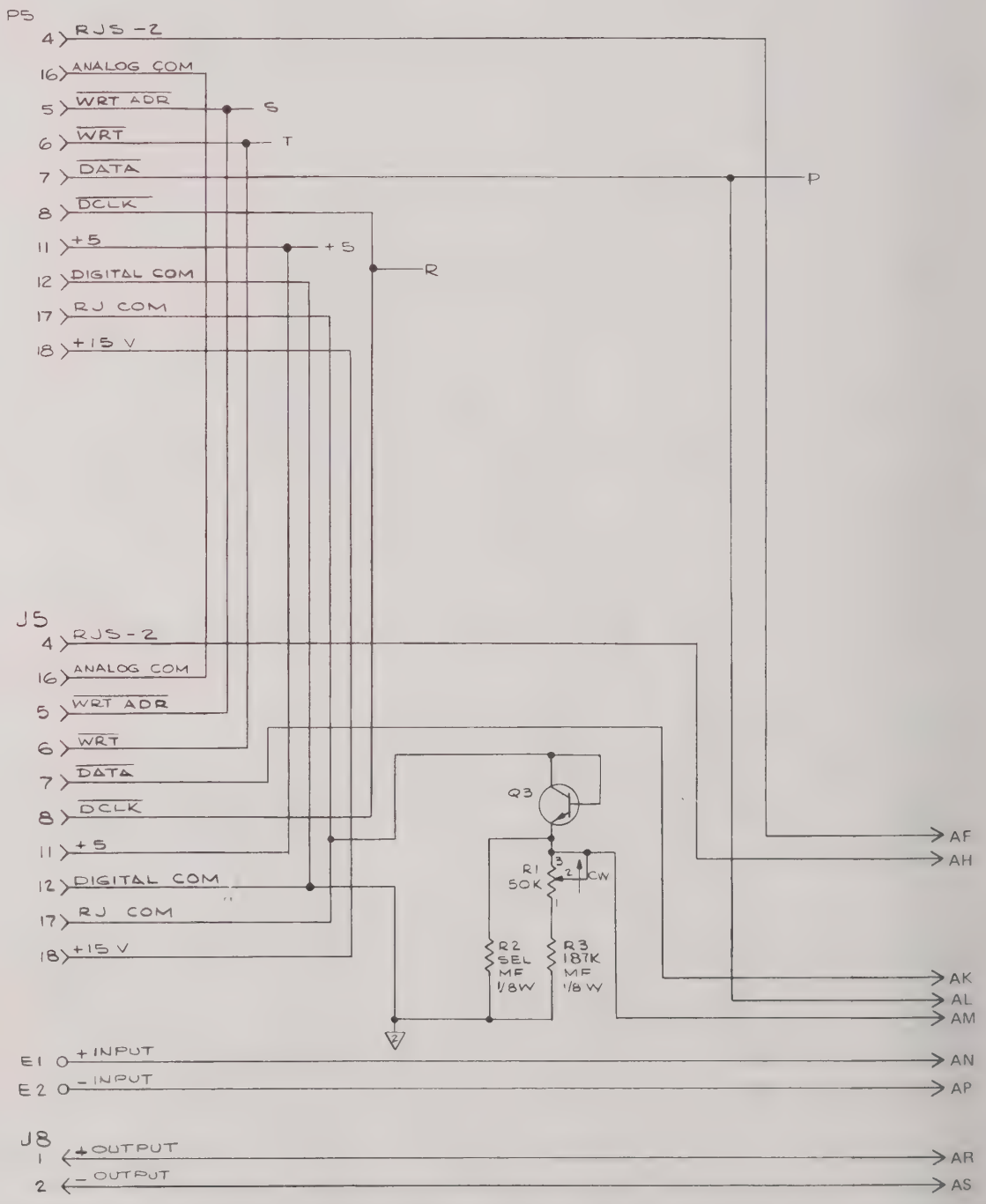
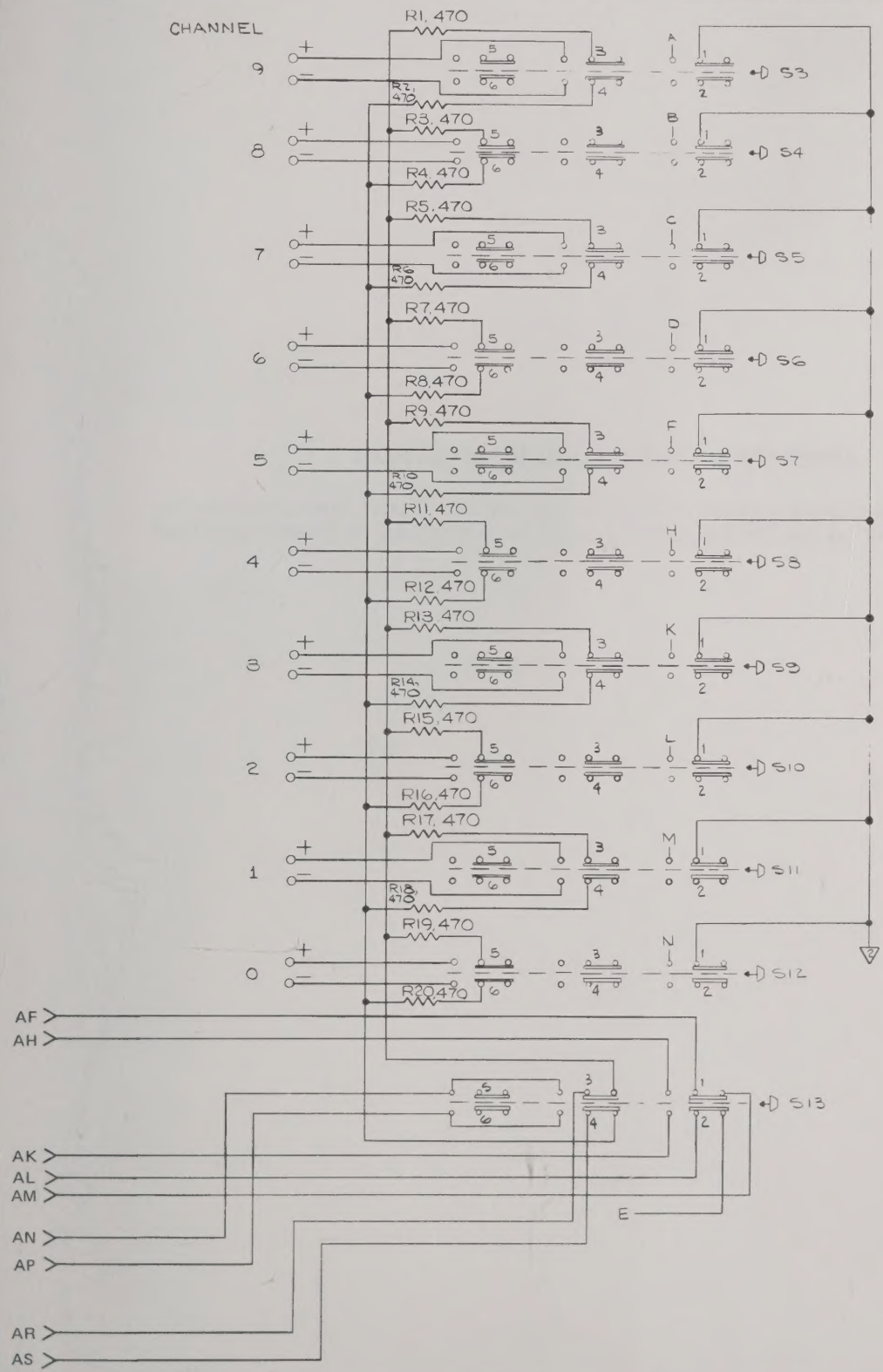


Figure 6. Thermocouple Multipoint Selector Schematic


P5
4 RJS -Z
16 ANALOG COM
5 WRT ADR
6 WRT
7 DATA
8 DCLK
11 +5
12 DIGITAL COM
17 RJ COM
18 +15 V
S
T
+5
R
P
J5
4 RJS-Z
16 ANALOG COM
5 WRT ADR
6 WRT
7 DATA
8 DCLK
11 +5
12 DIGITAL COM
17 RJ COM
18 +15 V
Q3
R1
50K
CW
R2
SEL
MF
1/8W
R3
187K
MF
1/8 W
AF
AH
AK
AL
AM
E1 +INPUT
E2 -INPUT
AN
AP
J8
1 +OUTPUT
2 -OUTPUT
AR
AS



2190A-1030
(Sheet 2 of 2)

Figure 6. Thermocouple Multipoint Selector Schematic (cont)

APPENDIX A BACK DATING INFORMATION

If the Revision letter stamped on the main PCB is E or lower switches S1 and S2 are a rotary switch in lieu of the binary DIP switches. The Fluke and Mfg. Stock No. is 429357 and the Federal Supply Code is 89536.

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